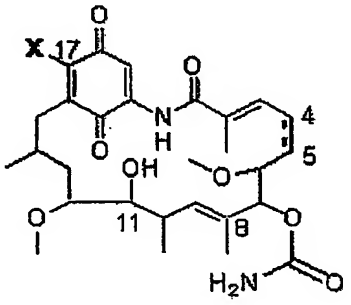
Claims

1. A composition comprising a compound, said compound comprising an HSP90 ligand selected from the group consisting of purines, ansamycins, radicicol, zearalanols, ATP analogs, indoles, chalcones, and benzimidazoles; said HSP90 ligand derivatized with a functional moiety selected from the group consisting of imaging agents, radioactive therapeutic agents, and cytotoxic agents.

2. The composition of claim 1 wherein said ligand is geldanamycin derivatized at one or more of the -8, -11, and -17 positions with said functional moiety.

3. The composition of claim 1 wherein said ligand is geldanamycin derivatized at position -17 with said functional moiety.

4. The composition of any of claims 1-3 wherein said ligand has formula A



A

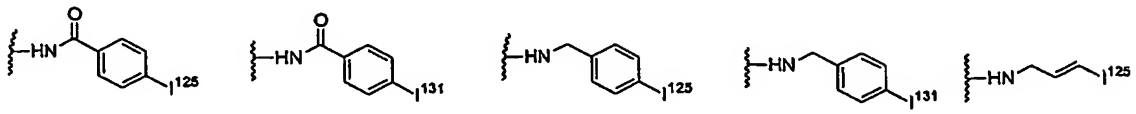
wherein X comprises said functional moiety, and wherein positions 4 and 5 are optionally both hydrated (4,5-dihydrogeldanamycin)..

5. The composition of any one of claims 1-3 wherein said functional moiety comprises a radioisotope.

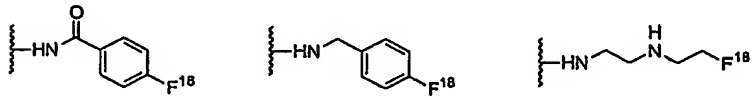
6. The composition of any one of claims 1-3 wherein said functional moiety comprises a radioisotope selected from the group consisting of Iodine^{125}, Iodine^{131}, ^{213}Bi, Technitium^{99m}, Technitium^{99}, Indium^{111}, Rhenium^{188}, Gallium^{67}, Copper^{67}, Yttrium^{90}, and Astatine^{211}.

7. The composition of claim 5 wherein said radioisotope is selected from the group consisting of ^{18}F, ^{11}C, ^{13}N, ^{123}I, ^{124}I, ^{125}I, ^{131}I, and ^{15}O.

8. The composition of claim 1 wherein said compound has a formula selected from among the following group of formulas



Radionuclide moieties
Radionuclide treatment



Radionuclide scanning (Positron Emission Tomography or PET)
Common isotopes are: 18F, 11C, 13N, 123I, 124I and 15O

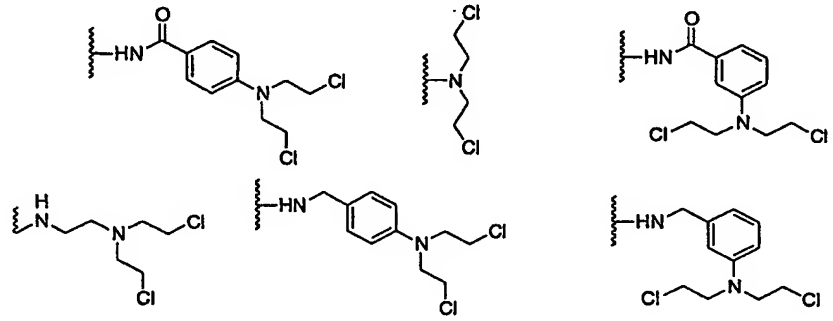
9. The composition of any one of claims 1-3 wherein said functional moiety comprises an imaging agent.

10. The composition of any one of claims 1-5 wherein said functional moiety comprises a radioactive therapeutic agent.

11. The composition of claim 1 wherein said functional moiety is selected from the group consisting of radioisotopes, antibodies, recombinant products, small molecules, antineoplastic agents, nitrogen mustard drugs (mustins), herceptin, taxol, taxanes and taxane derivatives, gleevec, alkylating agents, anti-metabilites; epidophyllotoxin; an antineoplastic enzyme; a topoisomerase inhibitor; procarbazine; mitoxantrone; platinum coordination complexes; biological response modifiers/growth inhibitors; hormonal/anti-hormonal therapeutic agents and haematopoietic growth factors, anthracycline drugs, vinca drugs, mitomycins, bleomycins, cytotoxic nucleosides, tepothilones, discodermolide, pteridine drugs, diynenes, podophyllotoxins, carminomycin, daunorubicin, aminopterin, methotrexate, methopterin, dichloromethotrexate, mitomycin C, porfiromycin, 5-fluorouracil, 6-mercaptopurine, gemcitabine, cytosine arabinoside, podophyllotoxin, podophyllotoxin derivatives, etoposide, etoposide phosphate or teniposide, melphalan, vinblastine, vincristine, leurosidine, vindesine, leurosine, paclitaxel, estramustine, carboplatin, cyclophosphamide, bleomycin, gemcitibine, ifosamide, melphalan, hexamethyl melamine, thiotepa, cytarabin, idatrexate, trimetrexate, dacarbazine, L-asparaginase, camptothecin, CPT -11, topotecan, ara-C, bicalutamide, flutamide,

leuprolide, pyridobenzoindole derivatives, interferons and interleukins, and photoactivatable compounds.

12. The composition of claim 1 wherein said compound has a formula selected from the following group of formulas



nitrogen mustard or "mustin" moieties

13. The composition of claim 1 wherein said functional moiety is a cytotoxic agent.

14. The composition of claim 13 wherein said compound has a formula selected from the group of formulas of any one of claims 6, 8 or 12.

15. A method of treating or preventing an HSP90-mediated disease, comprising administering to a subject a pharmaceutically effective amount of a composition according to claim 11.

16. A method of treating or preventing an HSP90-mediated disease, comprising administering to a subject a pharmaceutically effective amount of a composition according to claim 8.

17. The method of claim 15 or 16 wherein said disease is a cancer or tumor.

18. The method of claim 17 wherein said cancer or tumor is selected from a melanoma, breast, lung, or prostate cancer or tumor.

19. The method of claim 15 or 16 wherein the cells of said subject express supra-normal levels of Her-2 transcript or protein.

20. The method of claim 15 or 16 wherein cells of said subject express supra-normal levels of HSP90 client proteins.

21. The method of treatment or prevention of claim 15 or 16 wherein said disease is an infection.

22. The method of treatment or prevention of claim 21 wherein said infection is a viral infection.

23. The method of treatment or prevention of claim 15 or 16 wherein said administration is oral or topical.

24. The method of treatment or prevention of claim 15 or 16 wherein said administration is parenteral.

25. The method of treatment or prevention of claim 15 or 16 wherein said administration is in situ.

26. The method of treatment or prevention of claim 15 or 16 wherein said subject is a mammal.

27. The method of claim 15 or 16 wherein said mammal is a human.

28. The method of claim 15 or 16 wherein said treatment is part of a chemotherapy regimen.

29. A method of diagnosing or monitoring the progress or regression of an HSP90-mediated disease, comprising:

administering to the cells of a subject having or suspected of having an HSP90-mediated disease a composition according to any one of claims 1, 5-10, or 12; and

evaluating said cells for the presence of said compound.

30. The method of claim 29 optionally further comprising comparing the amount of compound in said cells with compound in normal cells.

31. The method of claim 29 or 30 wherein said administering is ex vivo.

32. The method of claim 29 or 30 wherein said administering is in vivo.

33. The method of claim 29 or 30 wherein said administering is in situ.

34. The method of claim 32 wherein said administering is selected from the group of administration modes consisting of oral, topical, parenteral, buccal, intravenous, subcutaneous, and intramuscular.

35. The method of any of claims 29-35 wherein said evaluating is performed using positron emission tomography (PET).

36. The method of any of claims 29-35 wherein said cells are tumor or cancer cells.

37. The method of any of claim 29-36 wherein said tumor or cancer cells are selected from the group consisting of melanoma, breast, lung, and prostate.

38. The method of any of claims 29-37 wherein said subject is a mammal.

39. The method of claim 38 wherein said mammal is a human.